

IN THE CLAIMS:

Claims 1, 3, and 19 have been amended herein. New claim 30 has been added. Please cancel claims 11 and 27 through 29 without prejudice or disclaimer. Please note that all claims currently pending and under consideration in the referenced application are shown below. Please enter these claims as amended. This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (Currently Amended) A method of cleaning a semiconductor wafer including at least one registration mark, comprising:

providing a semiconductor wafer comprising at least one registration mark, the at least one registration mark comprising at least one trench having a trench width from approximately 1.0 μm to approximately 3.0 μm ;

exposing the semiconductor wafer to a cleaning solution comprising tetramethylammonium hydroxide and at least one surfactant, the at least one surfactant ~~comprising at least one acetylenic diol surfactant~~ comprising α -(nonylphenyl)-omega-hydroxy-branched poly(oxy-1,2-ethanediyl) and 2,4,7,9-tetramethyl-5-decyne-4,7-diol-ethoxylate; and

exposing the semiconductor wafer to ultrasonic or megasonic vibrational energy.

2. (Original) The method of claim 1, wherein providing a semiconductor wafer comprising at least one registration mark comprises providing a semiconductor wafer contaminated with organic particles in the at least one registration mark.

3. (Currently Amended) The method of claim 1, wherein providing a semiconductor wafer comprising at least one registration mark comprises providing a semiconductor wafer contaminated with polymeric, organic particles in the at least one registration ~~mark~~ mark.

4. (Original) The method of claim 1, wherein providing a semiconductor wafer comprising at least one registration mark comprises providing a semiconductor wafer having at least one registration mark having trenches at least partially filled with organic particles.

5. (Original) The method of claim 1, wherein providing a semiconductor wafer comprising at least one registration mark comprises providing a semiconductor wafer comprising at least one registration mark having a trench width of approximately 1.2 μm .

6. (Original) The method of claim 1, wherein providing a semiconductor wafer comprising at least one registration mark comprises providing a semiconductor wafer comprising at least one registration mark having a trench width of approximately 2.8 μm .

7. (Original) The method of claim 1, wherein exposing the semiconductor wafer to a cleaning solution comprising tetramethylammonium hydroxide and at least one surfactant comprises exposing the semiconductor wafer to a cleaning solution comprising from approximately 0.01% by weight to approximately 25% by weight tetramethylammonium hydroxide.

8. (Original) The method of claim 1, wherein exposing the semiconductor wafer to a cleaning solution comprising tetramethylammonium hydroxide and at least one surfactant comprises exposing the semiconductor wafer to a cleaning solution having a pH greater than approximately 7.5.

9. (Original) The method of claim 1, wherein exposing the semiconductor wafer to a cleaning solution comprising tetramethylammonium hydroxide and at least one surfactant comprises exposing the semiconductor wafer to a cleaning solution having a pH greater than approximately 9.

10. (Original) The method of claim 1, wherein exposing the semiconductor wafer to a cleaning solution comprising tetramethylammonium hydroxide and at least one surfactant comprises exposing the semiconductor wafer to a cleaning solution having a pH greater than approximately 10.

Claim 11 (Canceled)

12. (Original) The method of claim 1, wherein exposing the semiconductor wafer to a cleaning solution comprising tetramethylammonium hydroxide and at least one surfactant comprises exposing the semiconductor wafer to a cleaning solution comprising tetramethylammonium hydroxide and at least one surfactant comprising from approximately 20% to approximately 50% α -(nonylphenyl)-omega-hydroxy-branched poly (oxy-1,2-ethanediyl) and from approximately 2% to approximately 10% 2,4,7,9-tetramethyl-5-decyne-4,7-diol-ethoxylate.

13. (Original) The method of claim 1, wherein exposing the semiconductor wafer to a cleaning solution comprising tetramethylammonium hydroxide and at least one surfactant comprises immersing the semiconductor wafer in the cleaning solution.

14. (Original) The method of claim 1, wherein exposing the semiconductor wafer to ultrasonic or megasonic vibrational energy comprises exposing the semiconductor wafer to a vibrational energy ranging from approximately 40 kHz to approximately 104 kHz.

15. (Original) The method of claim 1, wherein exposing the semiconductor wafer to ultrasonic or megasonic vibrational energy comprises exposing the semiconductor wafer to a vibrational energy ranging from approximately 850 kHz to approximately 1.5 MHz.

16. (Original) The method of claim 1, further comprising exposing the semiconductor wafer to a temperature ranging from approximately 25°C to approximately 65°C.

17. (Original) The method of claim 1, further comprising exposing the semiconductor wafer to a temperature ranging from approximately 55°C to approximately 65°C.

18. (Original) The method of claim 1, wherein exposing the semiconductor wafer to a cleaning solution comprising tetramethylammonium hydroxide and at least one surfactant comprises spraying the cleaning solution on a surface of the semiconductor wafer.

19. (Currently Amended) A method of cleaning a semiconductor wafer including at least one registration mark, comprising:

providing a semiconductor wafer comprising at least one registration mark, the at least one

registration mark comprising at least one trench having a trench width from

approximately 1.0 μm to approximately 3.0 μm ;

contacting the semiconductor wafer with a spray of a cleaning solution comprising

tetramethylammonium hydroxide and at least one surfactant, the at least one surfactant

comprising at least one acetylenic diol surfactant comprising α -(nonylphenyl)-omega-hydroxy-branched poly (oxy-1,2-ethanediyl) and 2,4,7,9-tetramethyl-5-decyne-4,7-diol-ethoxylate.

20. (Original) The method of claim 19, wherein providing a semiconductor wafer comprising at least one registration mark comprises providing a semiconductor wafer having organic particles in the at least one registration mark.

21. (Original) The method of claim 19, wherein providing a semiconductor wafer comprising at least one registration mark comprises providing a semiconductor wafer having polymeric, organic particles in the at least one registration mark.

22. (Original) The method of claim 19, wherein providing a semiconductor wafer comprising at least one registration mark comprises providing a semiconductor wafer having at least one registration mark that is at least partially filled with the organic particles.

23. (Original) The method of claim 19, wherein providing a semiconductor wafer comprising at least one registration mark comprises providing a semiconductor wafer comprising at least one registration mark having a trench width of approximately 1.2 μm .

24. (Original) The method of claim 19, wherein providing a semiconductor wafer comprising at least one registration mark comprises providing a semiconductor wafer comprising at least one registration mark having a trench width of approximately 2.8 μm .

25. (Original) The method of claim 19, wherein contacting the semiconductor wafer with a spray of a cleaning solution comprising tetramethylammonium hydroxide and at least one surfactant comprises contacting the semiconductor wafer with a high-pressure jet spray or a high-velocity aerosol spray.

26. (Original) The method of claim 19, further comprising exposing the semiconductor wafer to an ultrasonic or megasonic vibrational energy.

Claims 27-29 (Canceled)

30. (New) A method of cleaning a semiconductor wafer including at least one registration mark, comprising:
providing a semiconductor wafer comprising at least one registration mark, the at least one registration mark comprising at least one trench having a trench width from approximately 1.0 μm to approximately 3.0 μm ;
exposing the semiconductor wafer to a cleaning solution that consists essentially of tetramethylammonium hydroxide and at least one surfactant, the at least one surfactant comprising at least one acetylenic diol surfactant; and
exposing the semiconductor wafer to ultrasonic or megasonic vibrational energy.